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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,086	06/30/2003	William Earl Russell II	24GA5998-7	8107

33727 7590 08/15/2006

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EXAMINER
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PALABRICA, RICARDO J

ART UNIT	PAPER NUMBER
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3663

DATE MAILED: 08/15/2006

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/608,086

Filing Date: June 30, 2003

Appellant(s): RUSSELL ET AL.

**MAILED**

AUG 15 2006

**GROUP 3600**

July 18, 2006

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Gary D. Yacura  
For Appellant

**SUPPLEMENTAL EXAMINER'S ANSWER**

Pursuant to the remand under 37 CFR 41.50(a)(1) by the Board of Patent Appeals and Interferences on May 24, 2006 for further consideration of a rejection, a Supplemental Examiner's Answer is set forth below.

The remand by the Board directed the examiner:

*"to determine whether prior art is available that discloses or would have fairly suggested, to one of ordinary skill in the art, performing a computerized optimization process of a nuclear reactor to generate, from received state-point data, one or more independent control variables."*

As discussed in section 9 below, such prior art indeed exists in "Winning Strategies for Maintenance Optimization at U.S. NPPs" (Nuclear Plant Journal Editorial Archive, March 2000), in combination with previously applied prior art, Musick.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

A statement identifying the related appeals and interferences that will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4,080,251	Musick	3-1978
5,009,833	Takeuchi et al.	4-1991
	"Winning Strategies for Maintenance Optimization at U.S. NPPs" (Nuclear Plant Journal Editorial Archive)	3-2000

**(9) New Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 31-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Musick (U.S. 4,080,251) in view of "Winning Strategies for Maintenance Optimization at U.S. NPPs" (Nuclear Plant Journal Editorial Archive), hereinafter referred to as "Nuclear Plant Journal."

The examiner has discussed in the Examiner's Answer of November 2, 2005, how Musick's computerized method of controlling a nuclear reactor achieves maximization of plant capacity and availability within acceptable fuel design limits, under normal operation and anticipated operational occurrences.

The issue raised by the Board in its remand is whether this maximization of plant capacity and availability within acceptable design limits achieves optimization within those limits (see page 4, 2<sup>nd</sup> paragraph of the remand).

As stated in the Examiner's Answer, appellant's failure to define the term "optimization" required the examiner to apply its ordinary meaning, i.e.,

*"[A]n act, process or methodology of making something (as a design, system, decision) as fully perfect, functional, or effective as possible" (Merriam Webster's Collegiate Dictionary, 10<sup>th</sup> edition, 1993).*

The above definition of "optimization" does not call for an ABSOLUTE perfection of a process. Rather, it allows for perfection, within reasonable limits, as evidenced by the qualified language, "*as fully perfect, functional or effective **as possible**.*"

Such optimization by reasonable perfection is common in nuclear power plants because of the inherent interdependence of system parameters. Musick himself recognizes this fact by his statement:

*"Heretofore, the prior art has attempted core protection through means and methods that have sacrificed plant capacity and availability. Various schemes with different degrees of sophistication were implemented, none of which enable the utilization of the plant's full potential. The least sophisticated system consisted of the establishment of a series of independent limits for each of the parameters upon which the design limit in question depended. By doing so, this prior art method could not account for functional interdependence of all of the variables. Thus, the situation could arise in which one parameter deviated from its optimum value, without causing an approach to the design limit since the other parameters on which the design limit depended might have compensated for the one bad parametric value." See col. 4, lines 37+. Underlining provided.*

Clearly, Musick's maximization of plant capacity and availability within design limits optimizes ONLY selected parameters and NOT all parameters, because changing one parameter inherently causes change in some other parameters.

Musick does not explicitly refer to maximization of plant availability as optimization. However, Nuclear Plant Journal teaches several maintenance optimization strategies that have a common goal of increasing reliability and plant availability while reducing costs (see Abstract). It further teaches that optimizing maintenance processes, procedures and schedules reduces refueling outage duration, which inherently extend the interval between outages, and increases plant availability or capacity factors (see page 3, lines 11+). Maintenance processes also ensure that plant systems operate reliably and within design limits. The secondary reference clearly demonstrates the clear nexus between optimization and maximum plant availability.

The examiner has previously shown that Musick's computerized control process generates one or more independent control variables from received state-point data (see Examiner's answer, page 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have considered Musick's control process as an optimization that maximizes plant capacity and availability within acceptable fuel design, based on the teaching of Nuclear Plant Journal.

Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Musick with Nuclear Plant Journal, as applied to claims 31-39 above, and further in view of Takeuchi et al.

The Musick-Nuclear Plant Journal combination teaches using actual plant data to relate independent variables (e.g., DNBR) to the dependent variables (e.g., core power). See, for example, equation 1 at col. 3 of Musick.

Takeuchi et al. teach the use of simulated plant data for evaluating plant conditions (see Abstract).

One having ordinary skill in the art would have recognized that it is old and advantageous to use a simulator as a substitute for an actual reactor in conducting operational/safety analysis of plant conditions, because a simulator is inherently safer and more economical to use for this purpose.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method, as disclosed by the Musick-Nuclear Plant Journal combination, by the teaching of Takeuchi et al., to use simulated data instead of actual plant data, to gain the advantages thereof (i.e., safety and economy), because such modification is no more than the use of well-known expedients within the art, and the substitution of one source of plant data for analysis by another well-known source.

For the above reasons, it is believed that the rejections should be sustained.

The appellant must within TWO MONTHS from the date of the supplemental examiner's answer exercise one of the following two options to avoid sua sponte dismissal of the appeal as to the claims subject to the rejection for which the Board has remanded the proceeding:

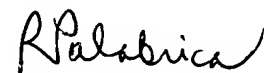
(1) **Reopen prosecution.** Request that prosecution be reopened before the examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit, or other evidence. Any amendment, affidavit, or other evidence must be relevant to the issues set forth in the remand or raised in the supplemental examiner's answer. Any request that prosecution be reopened will be treated as a request to withdraw the appeal. See 37 CFR 41.50(a)(2)(i).

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. If such a reply brief is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened under 37 CFR 41.50(a)(2)(i). See 37 CFR 41.50(a)(2)(ii).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.



Respectfully submitted,

  
RICARDO J. PALABRICA, Ph.D.  
PRIMARY EXAMINER

**A Technology Center Director or designee has approved this supplemental  
examiner's answer by signing below:**

  
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